

CALOSOMA (CASTRIDA) ALTERNANS GRANULATUM  
PERTY: A PREDATOR OF COTTON LEAF WORMS IN  
BOLIVIA (COLEOPTERA: CARABIDAE: CARABINI)<sup>1</sup>

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ABSTRACT

The ground beetle, *Calosoma (Castrida) alternans granulatum* Perty, is an efficient predator of the cotton leaf worms *Alabama argillacea* (Hübner) and *Spodoptera frugiperda* (J. E. Smith) in Bolivia and is a highly promising biological control agent against these pests. Field investigations indicate that these beetles are capable of keeping leaf worm populations within economically acceptable limits, thus eliminating need for at least 1 and perhaps 2 initial insecticide applications. *C. a. granulatum* should therefore be considered as a potentially highly useful element in integrated biocontrol programs against cotton pests elsewhere in South America and also in the agricultural ecosystem on the southern United States.

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Species belonging to the genus *Calosoma* (the caterpillar hunters) have been known since at least 1840 to be voracious predators on lepidopterous larvae (DeBach 1964). Their ability to climb plants large enough to support them, the speed with which they move, and their large size make them formidable enemies of any lepidopterous immatures they may encounter. Burgess (1911a, b) and Burgess and Collins (1915, 1917) have studied the biology of many species of *Calosoma*, especially *C. sycophanta* L., found in the Northeastern part of the United States. These workers were able to utilize some of the native species and *C. sycophanta*, which was introduced into the U.S. from Europe, as biological control agents against the Gypsy Moth, *Porthetria dispar* (Linn.). Gidaspow (1959, 1963) studied the taxonomy of the genus in North and South America.

During the north temperate winter months of 1970-71 and 1971-72 I worked for the Asociacion de Productores de Algodon in Santa Cruz, Bolivia as a consultant on entomological problems associated with cotton. The principal objective of the work was to develop an integrated control program that would maximize the use of native beneficial insects and reduce insecticide applications. During a normal cotton growing season in Bolivia the first major insecticide applications are made for the control of cotton leaf worms, principally *Alabama argillacea* (Hübner) (Fig. 1) and *Spodoptera frugiperda* (J. E. Smith). I found that the carabid *Calosoma (Castrida) alternans granulatum* Perty (Fig. 2) was a major predator on these two leaf worms both in the larval and pupal stages (Fig. 3). *C. a. granulatum* was very abundant in cotton fields around Santa Cruz and readily fed on the leaf worms during the day and at night. The beetles were present during December, January, and February and are readily attracted to street lights and black lights.

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fig. 1



fig. 3

Figure 1. *Alabama argillacea* (Hübner) feeding on cotton.

Figure 3. *C. a. granulatum* feeding on pupa of *A. argillacea* on cotton.

This information coupled with the fact that a cotton plant can suffer 30% to 40% defoliation without a reduction in yield (Charles G. Lincoln, personal communication)<sup>2</sup> provided an opportunity to utilize *C. a. granulatum* as a biological control agent. I also found that as the plants were reaching 40% defoliation many of the leaf worms had completed feeding and were beginning to pupate in the leaves on the cotton plants. Thus it appeared that if insecticide applications were not applied the *Calosoma* beetles would have an opportunity to attack and devour both the leaf worm larvae and the very vulnerable pupae. The predation on the larvae would considerably reduce immediate damage to the plant, and predation on the pupae would reduce the numbers in the next generation of leaf worms.

Several cotton growers (representing about 2,500 ha.) agreed to try a non-insecticide control program for leaf worms provided that daily checks were made of the fields involved, instead of the normal once a week check. With the help of Bolivian cotton scouts the program was initiated and proved to be successful. By allowing the predator to minimize this initial stage of leaf worm damage, at least 1 and possibly 2 insecticide applications were saved. More importantly the resident predator and parasite populations were protected from the adverse effects of the insecticide. It is my conclusion that *C. a. granulatum* may prove to be a valuable biological control agent in other areas of South America. This species might also be of value in the agricultural ecosystem of the southern United States.

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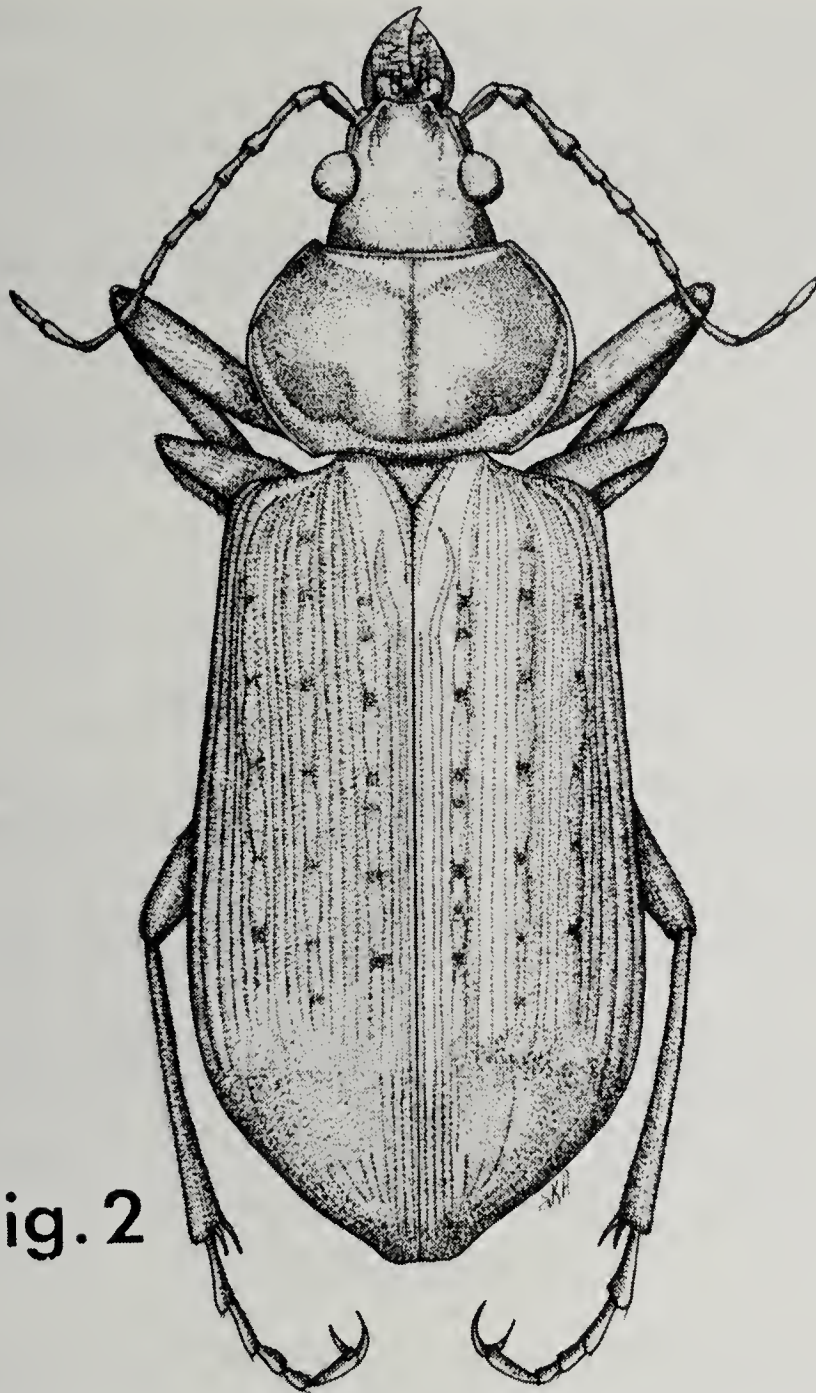


fig. 2

Figure 2. *Calosoma (Castrida) alternans granulatum* Perty, habitus.

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### LITERATURE NOTICES

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The phytophagous insect fauna of the Ragweed, *Ambrosia dumosa*, in Southern California, by Richard D. Goeden and Donald W. Ricker. 1976. Environmental Entomology 5(1):45-50.

The role of Seed-corn Beetles in predation of Cabbage Maggot immature stages, by J. A. Wyman, J. L. Libby, and R. K. Chapman. 1976. Environmental Entomology 5(2):259-263.

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### JOURNAL NOTICES

The Royal Entomological Society of London has changed the names of its Journals as follows:

Ecological Entomology continues from Transactions of the Royal Entomological Society of London, founded in 1834.

Physiological Entomology continues from Journal of Entomology (Series A), founded in 1926.

Systematic Entomology continues from Journal of Entomology (Series B), founded in 1932.

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### BOOK NOTICES

The distribution and diversity of soil fauna, by John A. Wallwork. 1976. Academic Press, 111 Fifth Avenue, New York, NY 10003. Hardbound, 356p., \$27.25.

The mathematical theory of the dynamics of biological populations, ed. by N. S. Bartlett & R. W. Hiorns. 1973. Academic Press, 111 Fifth Avenue, New York, NY 10003. Hardbound, 348p., \$21.50.

Perspectives in forest entomology, ed. by John F. Anderson & Harry K. Kaya. 1976. Academic Press, 111 Fifth Avenue, New York, NY 10003. Hardbound, 483p., \$17.50.

Man's plague?, by V. G. Dethier. 1976. Darwin Press, Princeton, NJ 08540. Hardbound, 238p., \$9.95.

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